

REMARKS

In view of the above amendments and following remarks, reconsideration and further examination are requested.

In the Office Action mailed August 6, 2007: claim 111 was rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 43 of U.S. Patent No. 6,632,335; claim 111 was rejected under 35 U.S.C. § 102(e) as being anticipated by Talieh; claim 110 and 112 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Dordi et al. '853 in view of Maloney et al., Mayer et al., Talieh and Dordi et al. '960; claim 113 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Talieh in view of Dordi et al. '960; claims 115 and 117 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Dordi et al. '853 in view of Talieh and Dordi et al. '960; claim 116 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Dordi et al. '853 in view of Maloney et al., Talieh and Dordi et al. '960; and claim 117 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Dordi et al. '853 in view of Maloney et al., Mayer et al., Talieh and Dordi et al. '960.

In reply to these positions taken by the Examiner, all claims have been canceled except for claims 112 and 113, and claim 112 has been amended. Accordingly, the rejections pertaining to claims 112 and 113 will be addressed.

Claim 112 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Dordi et al. '853 in view of Maloney et al., Mayer et al., Talieh and Dordi et al. '960. Amended claim 112 recites,

A semiconductor substrate processing apparatus,
comprising:
 a carry-in and carry-out section for carrying in and carrying
 out a semiconductor substrate having a surface on which a circuit
 is formed, in a dry state;
 a plated metal film forming unit for forming a plated metal
 film on said semiconductor substrate which has been carried in,
 said plated film forming unit including
 (i) a substrate holding portion for holding said
semiconductor substrate,

(ii) an anode disposed above a surface, to be plated, of said substrate when said substrate is held by said substrate holding portion,

(iii) a cathode electrode for passing an electric current in contact with said substrate when said substrate is held by said substrate holding portion,

(iv) a seal member positioned inwardly of said cathode electrode and in contact with said substrate when said substrate is held by said substrate holding portion,

(v) a plating liquid supply member for supplying plating liquid onto said semiconductor substrate when held by said substrate holding portion, and

(vi) a pure water supply member for supplying pure water after formation of the plated film,

wherein said substrate holding portion is movable, from a first position to a second position, away from said seal member and said cathode electrode such that pure water supplied when said substrate holding portion is in the first position is retained on said semiconductor substrate by said seal member, and pure water supplied when said substrate holding portion is in the second position underflows said seal member and contacts said cathode electrode for cleaning said cathode electrode;

a bevel etching unit operable to supply an acid solution to a center portion of said semiconductor substrate being rotated and to simultaneously supply an oxidizing agent solution to a peripheral edge portion of said semiconductor substrate so as to mix the acid solution and the oxidizing agent solution with each other on the peripheral edge portion of said semiconductor substrate for etching and removing at least one of said plated metal film, a seed layer and a barrier layer formed at the peripheral edge portion of said semiconductor substrate, and operable to rotate said semiconductor substrate so as to spin-dry said semiconductor substrate which has been etched; and

~~an annealing unit for annealing said semiconductor substrate; and~~

a transport mechanism for transporting said semiconductor substrate between said units, said transport mechanism having a dry hand for handling said semiconductor substrate in a dry state and a wet hand for handling said semiconductor substrate in a wet state.

Thus, claim 112 requires a semiconductor processing apparatus that includes a bevel etching unit operable to supply an acid solution to a center portion of a substrate being rotated and to simultaneously supply an oxidizing agent solution to a peripheral edge portion of the substrate to thereby mix the acid solution and the oxidizing agent solution with each other on the peripheral edge portion of the substrate. With this bevel etching unit, a plated film, a seed layer, and a barrier layer at the peripheral edge portion of the substrate are rapidly oxidized by the oxidizing agent solution, while a front surface of the substrate is cleaned by the acid solution. Because the acid solution and the oxidizing agent solution are mixed with each other on the peripheral edge portion of the substrate, a sharp etching profile can be obtained in connection with centrifugal force generated from the substrate being rotated, as compared with an etching unit capable of supplying an etchant directly to the peripheral portion of the substrate.

As suggested by the Examiner, Mayer et al. teaches providing a nozzle capable of supplying an acid solution (H_2SO_4) to a center portion of a substrate. Mayer et al. further teaches providing a nozzle capable of supplying an etchant to a peripheral portion of the substrate. However, Mayer et al. does not teach supplying an acid solution to the center portion of the substrate while *simultaneously* supplying an oxidizing agent solution to a peripheral edge portion of the substrate *to thereby mix the acid solution and the oxidizing agent solution with each other on the peripheral edge portion of the substrate*. Rather, the etchant which is used in Mayer et al., is a mixture of the acid solution and an oxidizing agent solution. In other words, the acid solution and the oxidizing agent solution are premixed, and then this mixture (i.e., the etchant) is supplied to the peripheral portion of the substrate. Therefore, Mayer et al. fails to teach mixing the acid solution and the oxidizing agent solution at the peripheral portion of the substrate. This deficiency is not remedied by any of the other relied-upon references, whereby claim 112 is allowable.

Claim 113 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Talieh in view of Dordi et al. '960. Claim 113 recites a plated metal film forming unit that includes a pure water supply member for *supplying pure water which underflows the seal member for cleaning the cathode electrode*. In supporting this rejection, the Examiner states that Talieh teaches

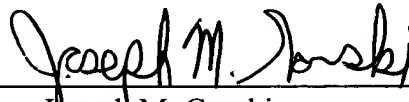
providing a plurality of liquid supplying members for supplying both plating liquid and pure water as needed. However, Talieh merely teaches supplying deionized water to a mechanical pad 32 via a channel 44, and Talieh does not teach supplying pure water when the substrate is away from the seal member so that the water underflows the seal member and contacts the cathode electrode for cleaning the cathode electrode. This deficiency is not remedied by Dordi et al. '960, whereby claim 113 is also allowable.

In view of the above amendments and remarks, it is respectfully submitted that the present application is in condition for allowance and an early Notice of Allowance is earnestly solicited.

If after reviewing this Amendment, the Examiner believes that any issues remain which must be resolved before the application can be passed to issue, the Examiner is invited to contact the Applicants' undersigned representative by telephone to resolve such issues.

Respectfully submitted,

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December 4, 2007